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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,317	11/19/2003	Neil R. Diener	Cognio24US2	8269
32604	7590	11/18/2004	EXAMINER	
COGNIO, INC. 101 ORCHARD RIDGE DRIVE SUITE 350 GAITHERSBURG, MD 20878			BEAMER, TEMICA M	
			ART UNIT	PAPER NUMBER
			2681	

DATE MAILED: 11/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/717,317

Applicant(s)

DIENER ET AL.

Examiner

Temica M. Beamer

Art Unit

2681

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12-16, 20-30 and 32-40 is/are rejected.
- 7) ☐ Claim(s) 11, 17-19, 31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this **National Stage** application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/04, 5/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5, 16, 20-25, 27, 33 and 38-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Oda et al (Oda), U.S. Pub. No. 2003/0045303.

Regarding claims 1 and 20, Oda discloses determining a location of a source of a wireless radio signal comprising steps of receiving the wireless radio signal at a plurality of known locations to generate receive signal sample data representative thereof at each known location; using the receive signal sample data obtained at one of the known locations as a reference waveform, determining the time of arrival of the wireless radio signal at each of the known locations; computing the time difference between the time of arrival of the wireless radio signal and time of arrival of a reference signal at each of the known locations; and determining a location of the source of the wireless radio signal based on the time difference of arrival measurements at the plurality of known locations (0017).

Regarding claim 2, Oda discloses the method of claim 1, and further comprising the step of generating data associated with reception of the wireless radio signal at each known location, the data including one or more of bandwidth, duration, center frequency and signal strength (signal delay is directly related to the signal strength) (0017).

Regarding claim 3, Oda discloses the method of claim 2, and further comprising the step of comparing the data associated with reception of the wireless radio signal received at each known location to determine the known location that best receives the wireless radio signal, and wherein the receive signal sample data at the known location that best receives the wireless radio signal is used for the reference waveform (0022).

Regarding claim 5, Oda discloses the method of claim 2, wherein the step of comparing comprises comparing the received signal strength of the wireless radio signal at each of the known locations and selecting as the reference waveform the receive signal sample data at the known location with the strongest received signal strength (0022).

Regarding claim 16, Oda discloses the method of claim 1, wherein the step of determining produces first and second candidate locations for the target device, and further comprising the step of selecting one of the first and second candidate locations as the actual location of the target device (0028).

Regarding claim 21, Oda discloses the system of claim 20, wherein each of the radio devices receives the wireless radio signals and generates receive signal sample

data representative thereof, and wherein the computing device selects as the reference waveform one of receive signal sample data from the radio devices (0017).

Regarding claim 22, Oda discloses the system of claim 20, wherein the computing device or the respective radio devices correlate receive signal sample data associated with the reference waveform to determine time of arrival of the wireless radio signal at each radio device (0017).

Regarding claim 23, Oda discloses the system of claim 20, wherein each of the radio devices generates data describing characteristics associated with its reception of the wireless radio signal, the data including one or more of bandwidth, duration, center frequency and signal strength (0017).

Regarding claim 24, Oda discloses the system of claim 23, wherein the computing device compares one or more of the data associated with reception of the wireless radio signal at each of the radio devices to select receive signal sample data as the reference waveform (0022).

Regarding claim 25, Oda discloses the system of claim 23, wherein the computing device selects the receive signal sample data at the radio device with the strongest received signal strength (0022).

Regarding claim 27, Oda discloses the system of claim 20, wherein a first radio device transmits the reference signal (0029).

Regarding claim 33, Oda discloses the system of claim 27, wherein the first radio device transmits the reference signal in response to receiving a transmission of the wireless radio signal (0029).

Regarding claim 35, Oda discloses the system of claim 20, wherein each of the radio devices comprises a buffer memory that stores receive signal data associated with reception of the reference signal and wireless radio signal from which time difference of arrival of those signals is determined (0021).

Regarding claim 38, Oda discloses a method for determining a location of a radio device based on a first time difference between arrival of a first signal at a first known location and arrival of a second signal transmitted by the radio device at the first known location, and at least a second time difference between arrival of the first signal at a second known location and arrival of the second signal at the second known location, where samples of the second signal received at one of the first and second known locations are used as a reference waveform to correlate to the second signal in order to determine time of arrival of the second signal (0017 and 0022).

Regarding claim 39, Oda discloses a processor readable medium encoded with instructions that, when executed by a processor, cause the processor to compute a location of a radio device based on a first time difference between arrival of a first signal at a first known location and arrival of a second signal transmitted by the radio device at the first known location, and at least a second time difference between arrival of the first signal at a second known location and arrival of the second signal at the second known location, where samples of the second signal received at one of the first and second known locations are used as a reference waveform to correlate to the second signal in order to determine time of arrival of the second signal (0017 and 0022).

Regarding claim 40, Oda discloses the processor readable medium of claim 39, and further comprising instructions encoded on the medium for comparing data associated with reception of the second signal at the first and second known locations to determine the known location that best receives the second signal, and wherein the receive signal sample data at the known location that best receives the second signal is used for the reference waveform (0017 and 0022).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4, 6-10, 12-15, 26, 28-30, 32, 34, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oda in view of Karmi et al (Karmi), U.S. Patent No. 6,246,884.

Regarding claim 4, Oda discloses the method of claim 1 as described above. Oda, however, fails to specifically disclose transmitting the receive signal sample data describing the reference waveform to each of the other known location to enable determination of the time of arrival at those known locations of the wireless radio signal.

In a similar field of endeavor, Karmi discloses a system and method for measuring and locating a mobile station signal in a wireless communication system. Karmi further discloses transmitting the receive signal sample data describing the

reference waveform to each of the other known location to enable determination of the time of arrival at those known locations of the wireless radio signal (col. 2, line 55-col. 3, line 5 and col. 8, lines 38-51).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Oda with the teachings of Karmi for the purpose of ensuring that a more accurate location of the mobile is determined.

Regarding claim 6, Oda discloses the method of claim 1 as described above. Oda, however, fails to disclose comprising the steps of transmitting the reference signal, and receiving the reference signal at each of the known locations.

Karmi discloses transmitting the reference signal, and receiving the reference signal at each of the known locations (col. 2, line 55-col. 3, line 5 and col. 8, lines 38-51).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Oda with the teachings of Karmi for the purpose of ensuring that a more accurate location of the mobile is determined.

Regarding claim 7, the combination of Oda and Karmi discloses the method of claim 6, and further comprising the step of transmitting the reference signal from a first known location (Karmi, col. 8, lines 38-50).

Regarding claims 8-10 and 12, the combination of Oda and Karmi discloses the method of claim 7 as described above (i.e., transmitting the reference signal).

The combination, however, fails to disclose transmitting the reference signal periodically or aperiodically. However, the examiner believes that the above limitations



would not render the claims patentable over the applied references because they merely depend on how often one would like to transmit the signal, without changing the scope of the invention in the applied references.

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the combination of Oda and Karmi for the purpose of more accurately locating the position of the mobile.

Regarding claim 13, Oda discloses the method of claim 1 as described above. Oda, however fails to disclose transmitting the reference signal from a first known location in response to receiving a transmission of the wireless radio signal at the first known location, and transmitting to each of the other known locations data describing the time delay at the first known location between the reception of the transmission of the wireless radio signal and transmission of the reference signal to enable the determination of the time difference of arrival at the other known location between the wireless radio signal and the reference signal.

Karmi discloses these limitations (col. 2, line 55-col. 3, line 5 and col. 8, lines 38-51).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Oda with the teachings of Karmi for the purpose of ensuring that a more accurate location of the mobile is determined.

Regarding claim 14, the combination of Oda and Karmi discloses the method of claim 13, wherein the step of transmitting the reference signal comprises transmitting a

Art Unit: 2681

probe request signal in accordance with an IEEE 802.11 communication standard (inherent to the GSM system) (Karmi, col. 7, lines 25-36).

Regarding claim 15, the combination of Oda and Karmi discloses the method of claim 7 as described above. The combination, however, fails to disclose wherein the step of transmitting comprises transmitting the reference signal multiple times from multiple antennas of a device, each time using different transmit antenna weights.

The examiner contends, however, that at the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the combination of Oda and Karmi with the above limitations for the purpose of increasing the chances of the reference signal reaching its location.

Regarding claim 26, Oda discloses the system of claim 22 as described above. Oda, however, fails to disclose wherein the computing device sends the receive signal sample data that is selected as the reference waveform to each of the other radio devices, wherein each of the radio devices use the reference waveform to determine the time arrival of the wireless radio signal and to compute the time difference of arrival between the reference waveform and the wireless radio signal.

Karmi discloses these limitations (col. 2, line 55-col. 3, line 5 and col. 8, lines 38-51).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Oda with the teachings of Karmi for the purpose of ensuring that a more accurate location of the mobile is determined.

Regarding claims 28-30 and 32, Oda discloses the system of claim 27 as described above. Oda, however, fails to disclose transmitting the reference signal periodically or aperiodically. However, the examiner believes that the above limitations would not render the claims patentable over the applied references because they merely depend on how often one would like to transmit the signal, without changing the scope of the invention in the applied references.

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Oda for the purpose more accurately locating the position of the mobile.

Regarding claim 34, Oda discloses the system of claim 33 as described above. Oda, however, fails to disclose wherein the first radio device or the computing device sends to each of the other radio devices data describing the time delay between reception of the transmission of the wireless radio signal at the first radio device and transmission of the reference signal by the first radio device to enable the determination of the time difference of arrival at the other radio devices between the wireless radio signal and the reference signal.

Karmi discloses these limitations (col. 2, line 55-col. 3, line 5 and col. 8, lines 38-51).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Oda with the teachings of Karmi for the purpose of ensuring that a more accurate location of the mobile is determined.

Regarding claim 36, the combination of Oda and Karmi discloses the system of claim 27 as described above.

The combination, however, fails to disclose wherein the first radio device transmits as the reference signal a request-to-send (RTS) signal.

The examiner contends, however, that at the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the combination of Oda and Karmi with a RTS signal since it is known in the art for radio devices to send request signals.

Regarding claim 37, the combination of Oda and Karmi discloses the system of claim 27, wherein the first radio device transmits as the reference signal a probe request frame in accordance with an IEEE 802.11 communication standard, and wherein the other radio devices are capable of receiving and recognizing the probe request signal (inherent to GSM) (Karmi, col. 7, lines 25-36).

#### ***Allowable Subject Matter***

5. Claims 11, 17-19 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 11, prior art fails to suggest or render obvious determining that transmissions of the wireless radio signal occur aperiodically, and further comprising

Art Unit: 2681

steps of transmitting the reference signal periodically, and continuously storing receive signal data at each of the known locations in a circular buffer in an attempt to capture at least one occurrence of a transmission of the wireless radio signal preceded by or followed by the reference signal.

Regarding claim 17, prior art fails to suggest or render obvious selecting comprises: a. computing an observed channel response between the target device and a plurality of antennas at each of the first and second known locations based on the second signal received at the plurality of antennas at each of the first and second known locations; b. computing candidate channel responses between the plurality of antennas for each of at least the first and second known locations and each of the first and second candidate locations; and c. choosing one of the first and second candidate locations that minimizes a sum-of-squares Euclidean distance between the observed channel response and the candidate channel responses for the first and second known locations, respectively.

Regarding claims 18 and 19, they are indicated allowable based on their dependence from allowable claim 17.

Regarding claim 31, prior art fails to suggest or render obvious wherein when it is determined that transmissions of the wireless radio signal occur aperiodically, the first radio device transmits the reference signal periodically and the radio devices continuously store receive signal data in a circular buffer in an attempt to capture at least one occurrence of a transmission of the wireless radio signal preceded by or followed by the reference signal.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Forssen et al, U.S. Patent No. 6,031,490, discloses determining the position of mobile radio terminals.

Cedervall et al, U.S. Patent No. 6,671,514, discloses location positioning of a mobile station in a CDMA cellular system.

Koorapaty et al, U.S. Patent No. 6,243,588, discloses a mobile positioning method for a portable communication device using shortened repetitive bursts.

Fattouch et al, U.S. Patent No. 6,266,014, discloses positioning of a mobile receiver using downlink signals.

Kong et al, U.S. Patent No. 6,473,619, discloses a mobile station positioning system and method in a mobile communication system.


Tsunchara et al, U.S. Pub. No. 2003/0050079, discloses a radio handset and position location system.

Amerga et al, U.S. Pub. No. 2002/0115448, discloses position determination in a wireless communication system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Temica M. Beamer whose telephone number is (703) 306-5837. The examiner can normally be reached on Monday-Thursday (alternate Fridays) 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (703) 308-4825. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Temica M. Beamer  
Examiner  
Art Unit 2681

November 15, 2004